

Work Order ID 77536

77536

Page 1

December-13-11 8:37:44 AM

Item ID: D212-664-101

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Item Name: Crosstube Fwd

Stop ***NS2***

Start Date: 13/12/2011 Start Qty: 1.00

1

Cust Item ID:

Required Date: 02/01/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: M.C.J Date: 11/12/13 Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr
D212-664-141	Rev D (DEO)

100 DOCUMENT CONTROL

0.00

100

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-101 CHG005

8/2/06/14

11-12-11

110 Pick Kit
Packaging

0.00

110

Packaging

Memo

0.00

Packaging

MO

11-12-22

120 BENDING MACHINE - CROSSTUBES

0.00

120

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio D212-664-101

TW

11-12-22

MO

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00							
130									
QC	Memo	0.00							
Quality Control									
140		0.00							
140									
Crosstubes									
Crosstubes	Memo	0.00							
	1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549,using drill table DT8577,set-up towers in hole #7 as per QSI 10								
	2-Ream hole to finish size in tube as per Dwg D212-664-141using drill Jig DT8548 & DT8549.Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.								
	3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141								
	4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141								

Sub 11/2/22

11-12-23

11-12-28

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Stop ***NS2***

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Start Date: 13/12/2011 Start Qty: 1.00

1

Cust Item ID:

Required Date: 02/01/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run Start ***NR1***

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	Crosstubes Chemical Conversion	0.00							
150									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	Chemical Conversion Coat within 24 hours of bending and drilling								
160	QC5- Inspect part completeness to step on W/O	0.00							
160									
QC	Memo	0.00							
Quality Control									
170	Outsource process - NDT per QSI038 4.1	0.00							
170									
Outsource2	Memo	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038 Issue P/O: <u>15757</u> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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N900040100Setup Start ***NS1***

Revision ID:

Item Name: Crosstube Fwd

Stop ***NS2***

Start Date: 13/12/2011 Start Qty: 1.00

1

Cust Item ID:

Required Date: 02/01/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***
Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	Receive & Inspect for Damage & Mat'l Certs	0.00							
180	Packaging								
	Memo	0.00							
	Ensure copy of NDT results attached to work order.								
190	QC5- Inspect part completeness to step on W/O	0.00							
190	QC								
	Memo	0.00							
	Quality Control								
	Inspect for damage & ensure results are as per Dwg D212-664-141								

U 11.12.29

Pto ⇒

m 11. 12. 29 (1)

W/O: 77536		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D212-664-101 PAR #: _____ Fault Category: Landig Gear NCR: Yes No DQA: 11/12 Date: 12/1/17
 Resolution: Re work Disposition: Re work QA: N/C Closed: 11/12 Date: 12/1/17

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
11/2/17	180	MARKING'S FOUND at NDT inspected (in sine RAD of Bend) R.C. Process	<u>AS</u> 11/2/17	→ Build out marking → Re Alodine as per QSR005 Re NDT NDT	<u>JW</u> 11/12/17	<u>S</u> 11/12/17	<u>AS</u> 11/12/17	<u>S</u> 11/12/17

NOTE: Date & initial all entries

Work Order ID 77536

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Item ID: D212-664-101 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Crosstube Fwd
 Start Date: 13/12/2011 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 02/01/2012 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200	Spray Painting per QSI005 4.2	0.00							
200	SprayPaint								
Spray Painting	Memo	0.00							
	1-Prime inside and outside crosstube as per QSI 005 4.2								
	2-Paint outside crosstube as per DEO D212-667-141 with White Imron as per QSI 005 4.2								
	PRIME:								
	Start Time: <u>7:30</u>								
	Fininsh Time: <u>9:30</u>								
	PAINT:								
	Start Time: <u>7:45</u>								
	Finish Time: <u>9:30</u>								
210	QC14- Inspect Spray Paint	0.00							
210									
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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NOTE: Date & initial all entries

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Accept

N900040100

Setup Start *NS1*

Stop *NS2*

Item Name: Crosstube Fwd

Start Date: 13/12/2011 **Start Qty:** 1.00

*** 1 ***

Cust Item ID:**Required Date:** 02/01/2012 **Req'd Qty:** 1.00

*** 1 ***

Customer:

Reference:

Run Start *NR1*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop *NR2*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

220

0.00

220

Crosstubes

0.00

Crosstubes

Crosstubes

Memo

1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe

2-Install supports with Proseal 890 per DSI9563 and QSI 015
A/R Proseal 890 Batch: 119396

3- Torque bolts as per dwg

~~11/11/12~~ 12-01-10

230

QC6- Inspect dimensions to drawing

0.00

230

Memo

0.00

QC

Quality Control

240

Pick Kit

0.00

240

Memo

0.00

Packaging

Packaging

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Work Order ID 77536

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Item ID: D212-664-101

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Fwd

Start Date: 13/12/2011 Start Qty: 1.00

1

Cust Item ID:

Required Date: 02/01/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250	QC4- 100% Inspect kits for completeness	0.00							
250									
QC	Memo	0.00							
Quality Control									
260	Packaging	0.00							
260									
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D212-664-101								
270	QC21- Final Inspection - Work Order Release	0.00							
270									
QC	Memo	0.00							
Quality Control									

5/2/00/11

R20H

103

12/11/12

12/11/12

ME
12-01-11

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

Picklist Print

December-13-11 8:37:48 AM

Page 1

Work Order ID: 77536

77536

Parent Item: D212-664-101

D212-664-101

Parent Item Name: Crosstube Fwd

Start Date: 13/12/2011

Required Date: 02/01/2012

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:E04.02.16ReformatKJ/DS

IPP Rev:F 06-03-29 Remove Coments on Pick List JLM

IPP Rev:G 07-04-30 As per Rev C JLM IPP Rev:H

11.04.26 inspection strip ecn 11-549 EC verified by:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-101TRN		Manufactured	No		<u>77736</u>	110	Each	0.0000	1	<u>1</u>	MO	11-12-22	
D212-664-101TRN									**				

Crosstube Turning Detail

D3595-063-450

Manufactured No

230

Each

118.1095

4

4.210526

D3595-063-450

**

RUBBER CUSHION

Location

Loc Qty

Loc Code

MAT052

118.109474

67353

3

68893

6

70113

0.56

71354

0.2

74113

11.349474

75597

97

4

1A2 12-01-10

MS21920-25

Purchased

No

220

Each

62.0000

4

4

MS21920-25

**

Clamp(per MIL-DTL-8783C)

Location

Loc Qty

Loc Code

LG

6

113281

0

113282

0

118142

4

119339

2

LG050

56

116264

2

117998

4

119746

50

4

1A2 12-01-10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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Picklist Print

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Page 2

Work Order ID: 77536

77536

Parent Item: D212-664-101

D212-664-101

Parent Item Name: Crosstube Fwd

Start Date: 13/12/2011

Required Date: 02/01/2012

Start Qty: 1.00

Required Qty: 1.00

D2893-1

Manufactured No

220

Each

27.0000

2

2

D2893-1

2.75 Support

*** 77606**

2

1/11 12-01-10

Location

Loc Qty

Loc Code

LG052

27

72865

2

76250

9

76928

16

D3428-1

Manufactured No

240

Each

26.0000

1

1

D3428-1

Placard

Location

Loc Qty

Loc Code

ST053

26

76508

26

AN6-35A

Purchased No

240

Each

64.0000

1

4

AN6-35A

BOLT

Location

Loc Qty

Loc Code

ST342

64

119449

34

119749

30

AN6-36A

Purchased No

240

Each

76.0000

4

4

AN6-36A

Bolt

Location

Loc Qty

Loc Code

ST342

76

118422

2

119449

24

119749

50

December-13-11 8:37:48 AM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Picklist Print

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Parent Item: D212-664-101

D212-664-101

Parent Item Name: Crosstube Fwd

Start Date: 13/12/2011

Required Date: 02/01/2012

Start Qty: 1.00

Required Qty: 1.00

MS21042L6

Purchased

No

240

Each

1,310.000

6

MS21042L6

**

Nut

Location

Loc Qty

Loc Code

ST300

1310

117677

25

118384

5

118927

48

~~118968~~

182

119075

1000

119736

50

AN960JD616

NAS1149D0663J

Purchased

No

240

Each

0.0000

18

18

AN960JD616

**

Washer

11/19/2011 10/1/11

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

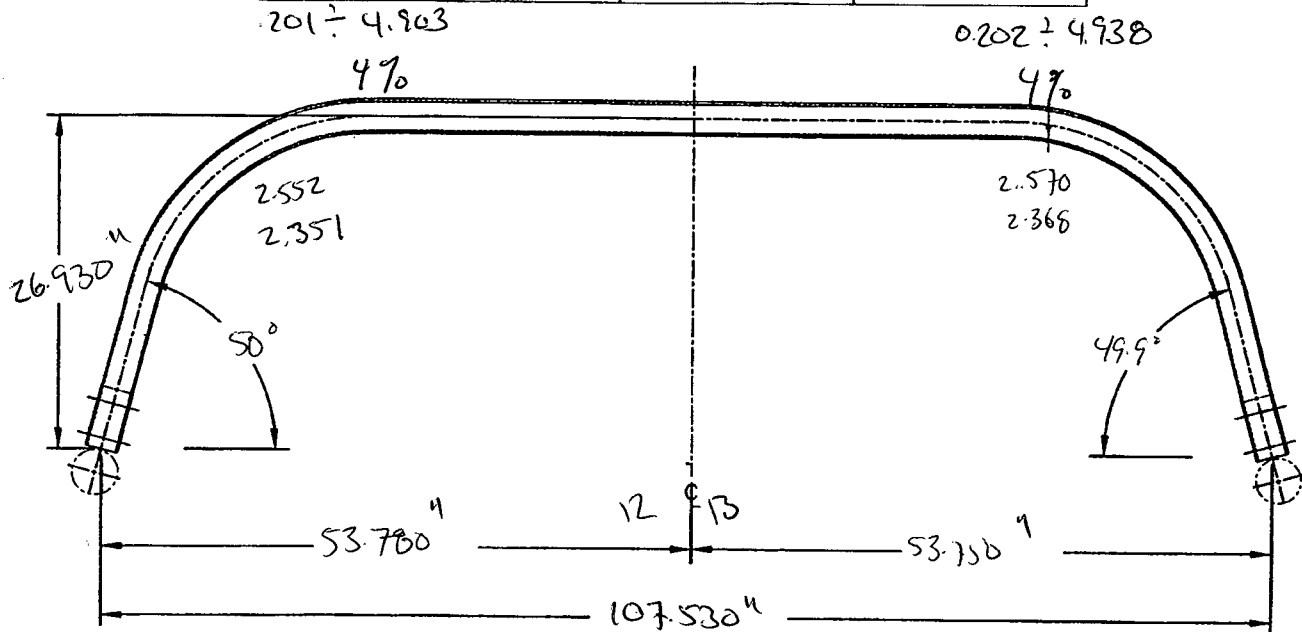
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order: 77536
Description: Crosstube High Fwd (205/212/412)	Part Number: D212-664-101
Inspection Dwg: D212-664-141 Rev: D	Page 1 of 1

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7



Comments
Sine A = 470 crushing @ 12 passes
Sine B = 470 crushing @ 13 passes

QC15 Inspection	8
Date	11/12/72

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM	
C	10.04.01	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

D

Item	Qty -141	Qty -141B	Part Number	Description
1	X		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 126.514±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS
- 7) WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS
6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE
SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR
DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND
MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT
HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 775364.1.5
11/12/13

REMOVED FROM UNDER REVIEW 902
UNDER REVIEW ECN# 11-614
21.07.26
FOR PRE-SEALING TAPING

DEO ATTACHED

RELEASED
2009-10-29

D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, C8-3 & B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	PH	DRAWING NO.	REV. D
MFG. APPR.	PH	D212-664-141	SHEET 1 OF 4
APPROVED	PH	TITLE	SCALE
DE APPR.	PH	XTUBE ASSY (205/212/412 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

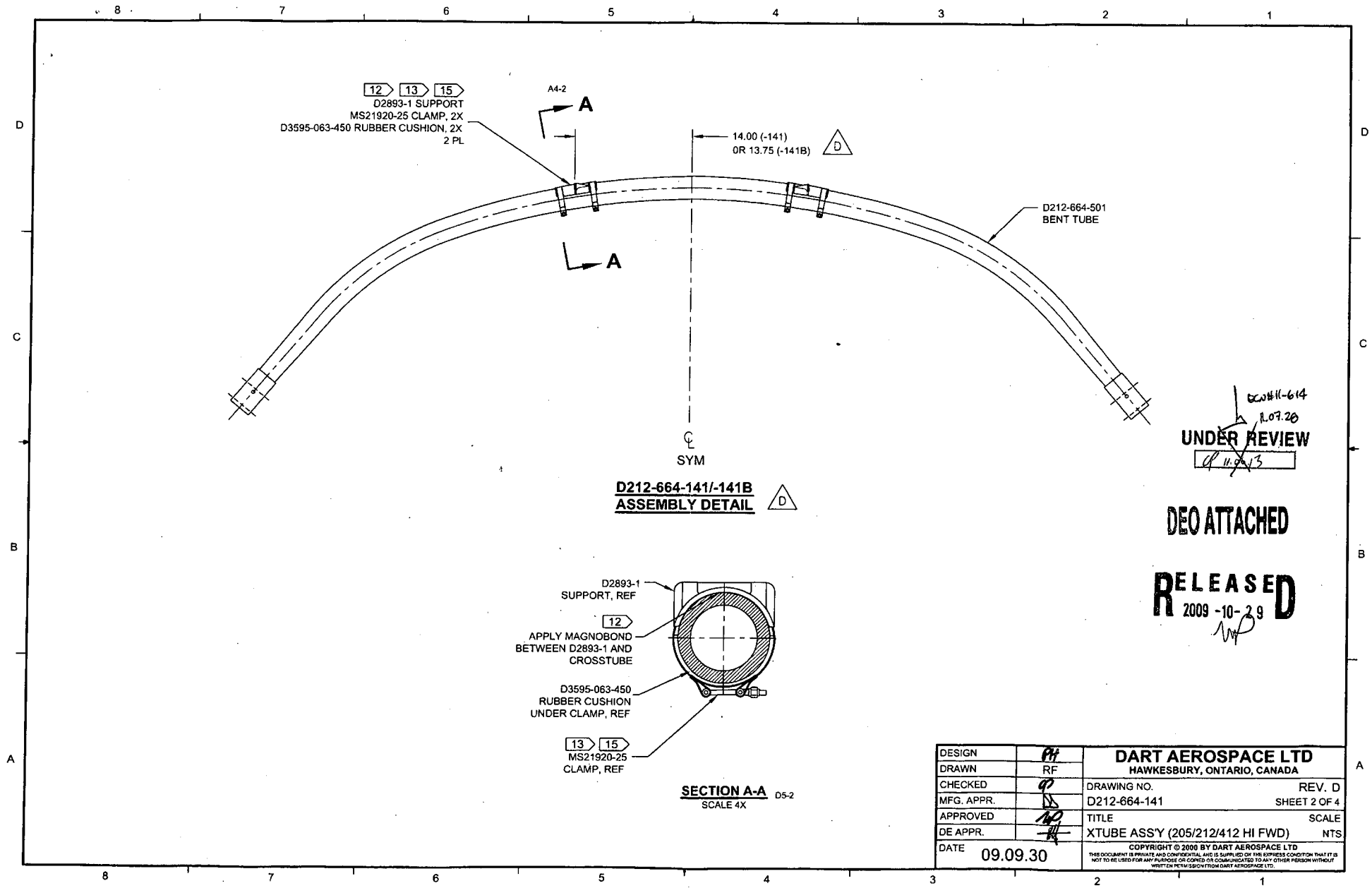
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

77536



DCO#11-614
R.07.20
UNDER REVIEW
01.11.13

DEO ATTACHED

RELEASED
2009-10-29
WP

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. D
MFG. APPR.	10	D212-664-141	SHEET 2 OF 4
APPROVED	10	TITLE	SCALE
DE APPR.	11	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

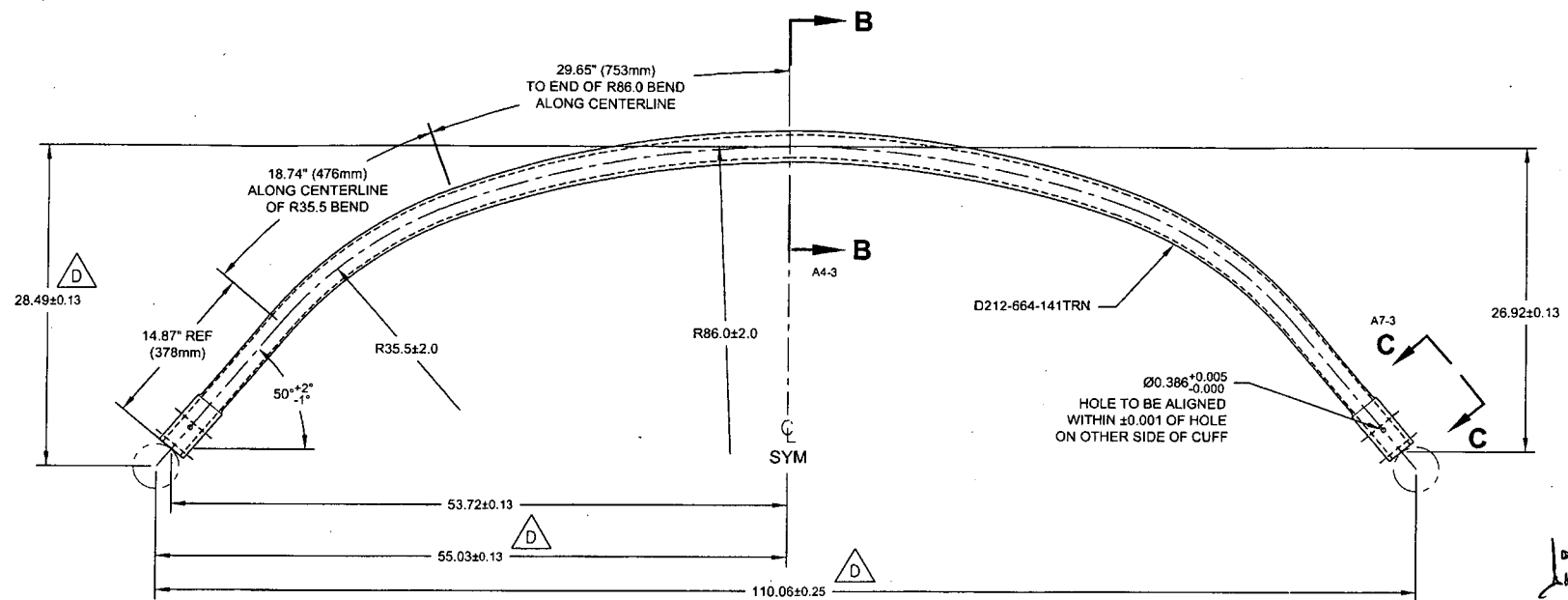
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

77536

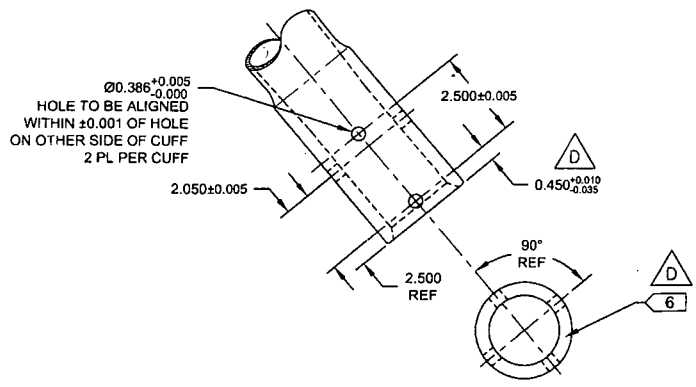


D212-664-501
BENDING AND DRILLING DETAIL

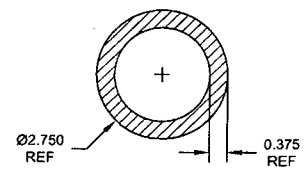
UNDER REVIEW
11.06.03

DEO ATTACHED

RELEASED
2009-10-29



VIEW C-C: CUFF DETAIL
SCALE 3X



SECTION B-B
SCALE 4X

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. D
MFG. APPR.	10	D212-664-141	SHEET 3 OF 4
APPROVED	10	TITLE	SCALE
DE APPR.	10	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

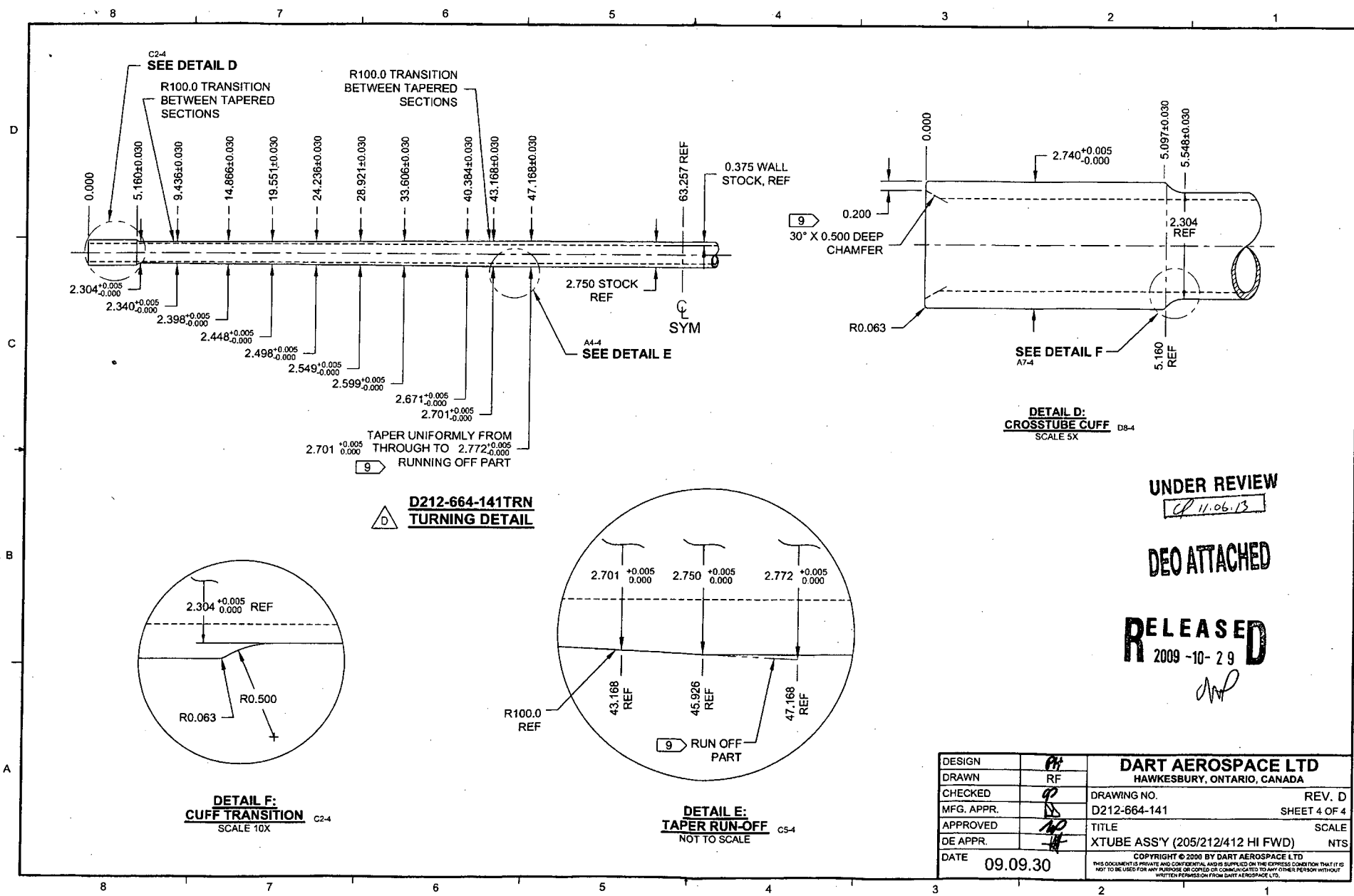
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

77536



DETAIL D:
CROSSTUBE CUFF D8-4
SCALE 5X

DETAIL F:
CUFF TRANSITION C2-4
SCALE 10X

DETAIL E:
TAPER RUN-OFF C5-4
NOT TO SCALE

D212-664-141TRN
TURNING DETAIL

UNDER REVIEW
11.06.13

DEO ATTACHED

RELEASED
2009-10-29
JMP

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9	DRAWING NO.	REV. D
MFG. APPR.	13	D212-664-141	SHEET 4 OF 4
APPROVED	12	TITLE	SCALE
DE APPR.	14	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
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Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

77536

DRAWING NO. D212-664-141	TITLE XTUBE ASSY (205/212/412 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-141-D-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN	CHECKED	MP	MFG. APPR.	RE	APPROVED	WAP	DE APPR.
DATE 11.04.07	DATE 11.04.11		DATE 11.04.12		DATE 11/04/12		DATE 11.04.12

PURPOSE:

ADD AN INSPECTION WINDOW TO UNDERSIDE OF CROSSTUBE.

CHANGE:

NOTES 2 OF SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND
PAINT OUTSIDE PER DART QSI 005 4.2
REMOVE MASKING AND APPLY CLEAR COAT

WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2

RELEASED
2011-04-18

UNDER REVIEW

14/05/13
12/05/11-614
12/11.07.28

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

77536

DRAWING NO. D212-664-141	TITLE XTUBE ASSY (205/212/412 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D212-664-141-D-1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN	CHECKED <i>CP</i>	MFG. APPR. <i>CE</i>	APPROVED <i>WD</i>	DE APPR. <i>WD</i>		
DATE 11.04.07	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12		

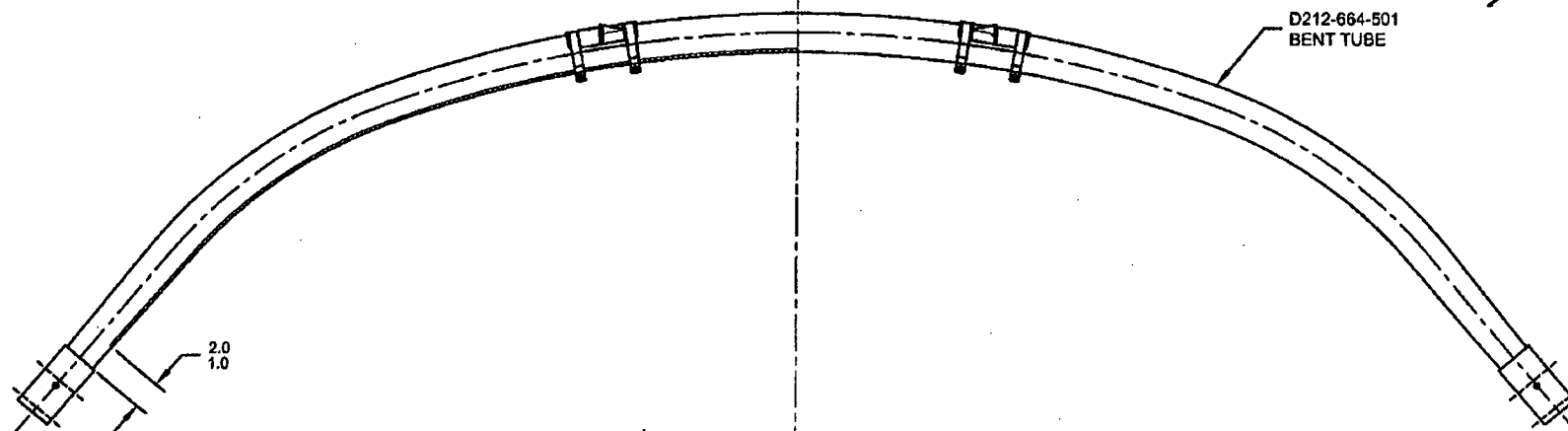
IS:

WAS:

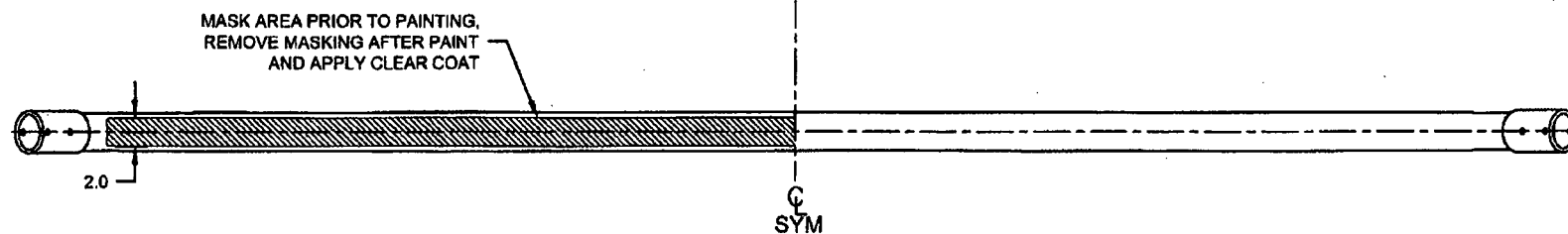
UNDER REVIEW

CP 11/06.13

ECN# 11-614
11.07.28



**D212-664-141/-141B
ASSEMBLY DETAIL**



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

77536

DRAWING NO. D212-664-141	TITLE CROSSTUBE ASS'Y (205 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-141-D-2	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>IP</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>AB</i>	APPROVED <i>MD</i>		DE APPR. <i>HH</i>		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21		DATE 11.07.21		

PURPOSE:
REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

Item	Qty -141	Qty -141B	Part Number	Description
7	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2893-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-07-28

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



E-44217

Form dated Sep 2005

Client: Port Aerospace
Contact: CHARTER
Location: 1270 ABEL DEEN HAWKES
Description: CH. 1 FLE. ON DISTRESS BING
Report #'s: AS FOLLOWS

Job #: _____
 Day: Sun Mon Tues
 P.O. #: _____
 Vehicle # 670

Date: Dec 29, 2011
 Wed Thurs Fri Sat
 W.O #: 183
 Camera #: 1

[illegible]

RADIOGRAPHIC UNIT PRICING																						
Weld Diameter											Long Seam						Circ. Seam					
Schedule / Thickness											Thickness						Thickness					
Quantity											Lineal Ft.						Lineal Ft.					

Film: _____ Pcs. 2 3/4 x 17"
 _____ Pcs. 3 1/2 x 17"
 _____ Pcs. 4 1/2 x 17"
 _____ Pcs. 14" x 17"
 _____ Pcs. _____

Consumables: _____

Equipment: _____

Client Representative: *X [Signature]*

Place a check mark in each safety check area as completed	
C/C	CAMERA CHECK
S/E	SAFETY EQUIPMENT CHECK
S/C	SURVEY METER CHECK
B/S	BARRRIER & SIGN INSTALLED
C/L	CAMERA LOCKED & SECURELY STORED
C/S	CAMERA SURVEYED AFTER EACH USE

EXPENSES

NOTES 5 checks to CES
W.O.*'s, 77536, 77535, 77748
77128, 77103
Machine Parts - W.O. 77128
77103

ACUREN 1-877-299-2857

Oakville	(905) 825-8595 • Fax (905) 825-8598
Sarnia	(519) 336-3021 • Fax: (519) 336-8220
Sudbury	(705) 522-1849 • Fax (705) 522-9926
Halifax	(902) 497-3870 • Fax (902) 445-5090
North Bay	(705) 840-8107 • Fax (705) 476-6683
Val D'Or	(819) 856-6789 • Fax (819) 825-9564

Cambridge	(519) 622-3112 • Fax (519) 622-1326
Cornwall	(613) 931-1261 • Fax (613) 931-2777
Saint John	(506) 847-0194 • Fax (506) 847-0194
Thunder Bay	(807) 475-4240 • Fax (807) 577-2017
Gaspé	(418) 392-3618 • Fax (418) 392-4114
Hull	(819) 360-0685 • Fax (819) 827-3513



LIQUID PENETRANT TEST REPORT

P- 12248

PAGE 1 OF 1

CLIENT DNT Aerospace DATE Dec 29-2011 TIME AM ☒ PM ☐
ATTENTION CHANTEL ACUREN JOB NO. 188-11-1
ADDRESS 1270 A BELL DRIVE PO/WO NO. 157571
HAWKESBURY, ON WORK LOCATION same
ACCEPTANCE STD. ASTM 1417/05-03 REV./DATE 2005
PROJECT FPI on FIVE CROSS TUBES
ITEM(S) EXAMINED 3 ENGINE MOUNTS

JOB DESCRIPTION PROCEDURE NO. LT-002 REV./DATE 2008 TECHNIQUE NO. LT-002 REV./DATE 2008
PART NO. SEE RESULTS MATERIAL ALUMINE ALUMINUM THICKNESS VARIABLES
SCOPE A WET FLUORESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE STAINLESS

TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNA FLUX BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT 2407 MINIMUM DWELL TIME 15 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER LABINO
DEVELOPER SKD52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE FEB 02
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY 7012

TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☐ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- ☐ METRIC ☐ IMPERIAL

1 CROSS TUBE W.O. 77536	✓	WELD REBOUND x (2)
1 CROSS TUBE W.O. 77535	✓	
1 CROSS TUBE W.O. 77748	✓	
1 ENGINE MOUNT W.O. 77128	✓	
2 ENGINE MOUNT W.O. 77103	✓	
1 CROSS TUBE W.O. 78023	✓	
1 CROSS TUBE W.O. 78024	✓	

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE Andrew Sheldon ASheldon DTR # E44217
TECHNICIAN (SIGNATURE): [Signature] [Signature] REPORT REVIEWED BY:
NAME (PRINT): Mike Johnson [Signature] NAME INITIALS
1ST TECHNICIAN 2ND TECHNICIAN
CGSB LEVEL 1 SNT LEVEL 1 CGSB LEVEL 1 SNT LEVEL 1
CGSB REG. NO. 6006 CGSB REG. NO. 6006